

initial light intensity to cause an increase in the radiated power. (See Standard M9-121.)

**T-106 Frame Frequency**

It shall be standard to use a frame frequency of 30 per second and a field frequency of 60 per second, interlaced.

**T-107 Number of Lines per Frame**

It shall be standard to use 441 lines per frame.

**T-108 Aspect Ratio**

The standard picture aspect ratio shall be 4:3.

**T-109 Percentage of Television Signal Devoted to Synchronization**

If the peak amplitude of the radio frequency television signal is taken as 100 per cent, it shall be standard to use not less than 20 per cent nor more than 25 per cent of the total amplitude for synchronizing pulses.

**T-110 Method of Transmission**

It shall be standard in television transmission that black shall be represented

by a definite carrier level independent of light and shade in the picture.

**T-111 Synchronizing**

The standard synchronizing signals shall be as shown on Drawing T-111.

**T-112 Transmitter Modulation Capability**

If the peak amplitude of the radio frequency television signal is taken as 100 per cent, it shall be standard for the signal amplitude to drop to 25 per cent or less of peak amplitude for maximum white.

**T-113 Transmitter Output Rating**

It shall be standard, in order to correspond as nearly as possible to equivalent rating of sound transmitters, that the power of television picture transmitters be nominally rated at the output terminals in peak power divided by four.

**T-114 Relative Radiated Power for Picture and for Sound**

It shall be standard to have the radiated power for the picture approximately the same as for sound.

**FOR LATEST  
TELEVISION DEVELOPMENTS  
READ  
RADIO DAILY  
REGULARLY**

# CBS ENTERS TELEVISION

By

**PETER C. GOLDMARK**

*Chief Television Engineer*

**N**INETEEN THIRTY-NINE will find the Columbia Broadcasting System engaged in television on a major scale! That statement has been held in abeyance almost two years while CBS has been engaged in the construction and installation of a new 15-kilowatt television transmitter on the top floors of the Chrysler Building in New York City. Television studios are now nearing completion in the Grand Central Terminal, and according to the plans of the network, CBS will be presenting televised programs by early Summer.

While a great deal of supposition has been voiced by everyone as to what CBS plans to do in the television field, and how it will accomplish the same, the following account, the first authentic one, will explain the CBS set-up in its entirety.

The transmitter equipment weighs about 100,000 pounds and is to be located on the 73rd, 74th and 75th floors of the Chrysler Tower. This transmitter consumes about 300 kw. of electric power and represents the latest design in television and sound transmitters. The sound transmitter operates with a carrier of  $7\frac{1}{2}$  kw. on 55.75 Mgs., while the picture carrier will be between 50-55.25 Mgs.

The antenna is divided into two identical sections located one above the other just below the steel spire of the building.

The site was chosen in 1937 after careful study of the whole New York skyline had shown it to be the ideal location and capable of providing primary coverage within a radius of about 40 miles over a total area of about 4,800 square miles.

A space 280x60 feet square and 45 feet high on the third floor of the Grand Central Terminal is being reconstructed for the television studios. It is divided into a large Master Control Room, where all the equipment as well as the operators will be located, and into studio space.

There are several studio pickup and film channels available. A coaxial cable carries the picture signal from the studio to the Chrysler Building transmitter while special high fidelity lines will handle the audio signals.

The entire sound equipment, from the

studio to the antenna, is capable of handling frequencies up to 10,000 cycles and more. Since high class television receivers will be equipped to reproduce such frequencies, it is hoped that not only the visual broadcasting but a much-improved sound broadcasting service will be inaugurated by the new station, which is licensed to operate under the call letters W2XAX.

When the new station goes on the air it will climax almost a decade of experimentation by CBS which, in 1931, broadcast the first regular schedule of television programs undertaken in this country, using a mechanical system with 60 lines.

CBS has been actively engaged in research and development work in the field of high definition television since the beginning of 1936. At first experiments were carried out on 343 lines, but they soon were continued on today's standard of 441 lines, 30 frames.

The new laboratories located in the CBS building at 485 Madison Avenue, have, in the last two years, developed a complete low power television transmitter suitable for the transmission of motion picture film, either 16 or 35 mm. Certain parts of this equipment will be used in connection with high power transmissions from the Chrysler Building.

Gilbert Seldes will direct the programs to be heard over the television transmitter, and it is believed that before the end of 1939, CBS will be one of the leaders in the television field.

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## HISTORICAL RESUME OF THE DON LEE BROADCASTING SYSTEM TELEVISION STATION W6XAO

By

**HARRY R. LUBCKE**

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*Director of Television*

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**T**HE television research activities of the Don Lee Broadcasting System started in 1930. On December 23, 1931, television station W6XAO went on the air on the ultra-high frequency of 44,500 kc. on a one-hour-per-day schedule. Transmissions have been made daily, except Sundays, since that time, thereby establishing W6XAO as the oldest television broadcasting station in the United States operating on the now universally utilized ultra-high frequencies. At this early date 80-line images from motion picture film were broadcast. Scheduled transmissions were also made on 49,400 and 66,750 kc. during 1932 and 1933.

In April, 1932, a self-synchronized cathode-ray television receiver was demonstrated under home receiving conditions. In order to give this equipment an unusual test and prove that a power line connection was not required for synchronization, on May 21, 1932, the receiver was taken aloft in a tri-motored transport airplane, and images were received from W6XAO while flying above the city of Los Angeles.

In 1933 motion picture scenes of the damage caused by the Long Beach-Los Angeles earthquake were broadcast, as were scenes of the Stanford-University of Southern California football game, within a few hours after its conclusion. Altogether a total of over eleven million

feet of motion picture film have been telecast by W6XAO.

Research on high-definition television was started in 1934, and in 1935 W6XAO was broadcasting 300-line images.

Starting with an initial power of 150 watts, an increase to one kilowatt was made in the early part of 1938. With this power, image reception was possible at 20 to 30 miles from the transmitter in the cities of Long Beach and Pomona.

Throughout the period of operations, incidental to the telecasts, numerous inventions have been made and patented. Because of the early entry of W6XAO into the electronic television field, some of these are of fundamental importance.

Early in 1938, live subject pick-up equipment was placed in operation. Since then program activities have gone forward until there is now one twice-a-week 15-minute comedy serial, now in its 27th episode, entitled, "Vine Street," one weekly dramatic serial entitled, "The Gibbons Family," and one weekly fantasy currently depicting, "Alice in Wonderland." In addition, educational features sponsored by the University of Southern California, vocal, instrumental, and orchestral musical numbers, excerpts from circus life, fashion and home economic demonstrations, and Hollywood news commentators are telecast.

# TELEVISION FOR THE HOME

By

**SAMUEL M. SALTZMAN**

*President of the American Television Corporation  
130 West 56th Street, N. Y. C.*

**A** CHECKUP on the reams of published reports on television reveals that.

"Television Is Ready"

"Television Has a Long Way to Go"

"Video Art Just Around the Corner"

"Someone Has Moved the Corner!"

"Experts Concede Big Future for Television"

"Experts Minimize Television Progress"

and so on.

If the reader is confused he can't be blamed. But let us examine the facts. Nearly five years ago the same type of receiving set that works today was tested in Philadelphia and New York and found capable of picking up transmission from the Empire State Building.

## 1939 Picture

There have been few if any changes in those television receivers since 1934. At that time the best transmitted image was a 240-line picture. The present 441-line standard makes the 1939 version a clearly defined, detailed image of the televised subject. Otherwise, the only appreciable change in receiving sets for the home has been the elimination of two or three tuning knobs and the improvement of cabinet design. These two alterations have had little to do with the enjoyment of picture reception. In short, receiving sets for home use have been ready for many months.

## Tele Programs

During those months broadcasters experimented with the transmission of mo-

tion pictures, live talent programs, newsreels and "spot" news events. Their show originated from studio and portable-mobile, or outdoor truck transmitters and were intended chiefly to test improvements in the process of sensitizing and synchronizing the broadcast. The size of the audience was negligible in the matter of the number of receiving sets in use. But great significance is attached to the fact that a great number of such broadcasts have been witnessed by thousands of visitors to the showrooms and laboratories of the American Television Corporation, pioneers in the job of preparing television for the average American home.

The manufacturers of Videor believes that a great audience can be built in the United States by merchandising television sets on a "Model T" basis, a plan that puts the new art within easy reach of the home instead of establishing it as a luxury.

## Cathode Ray Tube

On this point, the size of the televised pictures has an important bearing. The

image is seen on the broad end of the cone-shaped cathode ray tube, or kinescope. A tube five inches in diameter gets its power and tuning support from about fifteen other smaller tubes in the receiver chassis. The larger the kinescope, the more intricate and costly the supporting circuit. The proportionate difference in the cost of a set providing a 10 or 12-inch picture is so considerable that its ultimate retail price would be prohibitive for several years to come. But the audiences attending ATC television shows have seen remarkable achievements of video engineering in the use of a 5-inch kinescope, whose image is more than two newspaper columns in width.

Imagine a better-than-two-column picture in your morning newspaper printed on good stock and covered by the finest of "dotted" screens—imagine the characters in such a picture lighting up, becoming active, moving about, talking, expressing themselves in movement and gesture equivalent in clarity to that depicted on the motion picture screen. The entire pictorial basis of your education, in school books, magazines, newspapers and periodicals is in pictures no smaller and no larger than those featured on the ATC Videor screen. By way of emphasis, it is important to repeat that such a screen size permits the virtues of clear definition, vivid detail and reasonable cost.

#### Picture Tuning

Next to picture size, inquiries often concern picture tuning. Videor is equipped for simple tuning to which radio users have become accustomed. One knob tunes in stations. For some time to come, this tuner will be used infrequently because two or more broadcasters will probably alternate in the use of the same wave length. A second knob achieves precision tuning, and a third functions to bring more light or shade into the subject and serves as the switch that turns the picture on and off.

Nothing will ever completely replace the theatre for amusement and entertainment away from the home, the newspaper for its reportorial account of the news of the world, or the stadium for its sports thrills. But America takes its miracles in stride. It knows television has passed the conversational stage. It is becoming better acquainted with the actual or pro-

jected contributions of RCA, General Electric, Farnsworth, Philco, Zenith and others in the preparation for living picture transmissions. It knows that over 50,000 daily marvel at television reception in London that boasts growing quality as well as frequency. It knows that millions have been spent in successful experimentation. It knows the World's Fair will signal the beginning of permanent public telecasting. It knows that the natural and wholesome competitive spirit that motivates existing radio networks and industrial sponsors will spur television progress.

#### Tele Sponsors

It is obvious that broadcasters need sponsors; sponsors need audiences; and audiences want programs. But which comes first? The American Television Corporation believes the audience is the first requisite. The audience can be built with reliable equipment. Videor has demonstrated its reliability to thousands of observers in the past year. Regular programs announced in advance would allow dealers to demonstrate the products of ATC and other manufacturers. The same industry-building programs would make the sets useful in the home as sight-and-sound units and in the consequent creation of an audience. With a pioneer audience thus established, sponsors would be offered the most powerful direct selling medium ever devised, and their sponsorship would provide television with its vital bloodstream. No medium better than television will place an advertiser face to face with his customer.

By the same token, public education will be served. Satisfactory tests have been already made of blackboard lectures by a university professor, fashion display by leading designers, defense tactics by the War Department, scientific instruction by filmed demonstration, etc. Experimental audience reactions have been watched closely for some time to determine the kind of program that will be demanded. Radio broadcasters throughout the country have conducted market research to determine the extent of local interest in television and the requirements for becoming a part of the eventual network of public transmitters.

#### Pioneer Audience

The pioneer audience in television will be participants in one of the most far-reaching and fascinating of all scientific advances. They will witness thrilling progress in the months to come and see history in the making. They will be in at the birth of an art that someone once said had to be born full-grown.

# TELEVISION STATIONS

— IN THE UNITED STATES —  
— LOCATION — PERSONNEL — FACILITIES —

## W2XAX NEW YORK CITY

**FREQUENCY:** Sight 51.25 Mcs. **SOUND,** 55.75 Mcs. **POWER:** Sight, 15,000 Watts (measured at peak of synchronizing pulses); Sound, 7,500 Watts. **OWNED AND OPERATED BY:** Columbia Broadcasting System. **BUSINESS ADDRESS:** 485 Madison Ave. **PHONE:** Wick-ersham 2-2000. **STUDIO ADDRESS:** Under construction in the Grand Central Palace Bldg. **TRANSMITTER AND ANTENNA LOCATION:** Chrysler Bldg. (Construction to be completed by Spring of 1939).

### Personnel

Chief Engineer.....Dr. Peter C. Goldmark  
Assistant Chief Engineer.....John N. Dyer  
Director of Television Programs..Gilbert Seldes

### FACILITIES

At present W2XAX is operated with a video power of 50 watts, at 485 Madison Avenue. Later in the Spring transmissions will be continued from the Chrysler Building on high power.

The television transmitter will be installed on the 73rd, 74th and 75th floors of the Chrysler Building. The equipment is designed to handle a video signal with a band width from 30 cycles to approximately 4.25 megacycles. Signals of either positive or negative polarity, as desired, will be radiated. The so-called DC type of picture transmission will be utilized which means that black components in the picture are referred to an absolute and constant value corresponding to a certain degree of modulation of the final carrier. The transmitter is capable of radiating about 12 kw. of power corresponding to the maximum white in the picture, or about 15 kw. corresponding to the peak of the synchronizing pulses. The total input power is about 300 kw. including auxiliary equipment.

The audio transmitter is capable of handling a frequency range from 30 to 15,000 cycles.

The video and audio input and monitoring equipment will be located in a shielded room on the 74th floor where the transmitters are also situated. On the 73rd floor transformers, reactors, motor generators and water cooling equipment will be placed, while the air conditioning equipment will be on the 75th floor.

The antenna consists of two pairs of dipoles horizontally oriented parallel to the building surface, the dipoles being located above each other and about  $\frac{1}{2}$  wavelength apart. The structure is repeated on all four sides of the building. The audio antenna is of similar construction yet will possibly consist of only one set of dipoles in order to keep the power of the audio transmitter the same as that of the video and audio carriers to their respective radiators. All antennas will be electrically heated from inside and thermostatically controlled so that detuning due to ice formation will be prevented.

A coaxial cable will carry the video signals from the studio in Grand Central Terminal Building to the transmitter at the Chrysler Building.

The Grand Central Studio, which is 270 feet long and 80 feet wide, has a main control room on the east side of the studio running across practically the full width of the studio. There will be an adequate number of cameras and telecine channels for both film and studio programs.

## W6XAO

LOS ANGELES—EST. 1931

**FREQUENCY:** Sight, 45,000 Kc. **Sound,** 54,000 Kc. **POWER:** Sight, 150 Watts; Sound, 150 Watts. **OWNED AND OPERATED BY:** Don Lee Broadcasting System. **BUSINESS ADDRESS:** Don Lee Bldg., Seventh & Bixel Sts. **PHONE:** VAndike 7111. **STUDIO AND TRANSMITTER LOCATION:** Same. **TIME ON THE AIR:** Nightly (except Sundays and holidays). Monday, 7:00 to 8:00 P.M.; Tuesday, 7:00 to 8:00 P.M.; Wednesday, 11:00 to 12:00 A.M. and 6:45 to 8:00 P.M.; Thursday, 7:00 to 8:00 P.M.; Friday, 6:45 to 8:00 P.M. and Saturday, 7:00 to 8:00 P.M. Other times experimentally, which are announced on regular schedules.

### Personnel

Director of Television.....Harry R. Lubcke  
Assistant Director of Television Wilbur E. Thorp  
Television Engineer.....William S. Klein  
Television Engineer.....Harold W. Jury  
Television Producer.....Jaime del Valle  
Assistant Producer.....Elbert Walker  
Lighting Supervisor.....Lee M. Cannon  
Sound Monitor Man.....Richard Bruce  
Makeup.....A. M. Haberman

## FACILITIES

**SYSTEM IN USE:** High-definition cathode-ray. Film equipment for broadcasting newsreels, shorts, and test items.

Mosaic live-pickup camera equipment for studio pickup.

**PATENTS:** United States and foreign patents covering film and live pickup, amplification, scanning sources, synchronization, receivers and cathode-ray tubes of Harry R. Lubcke are used in the work. The methods and equipment of the Don Lee System, though of the present high-definition cathode-ray type, are considerably different from those of other television organizations. Within the past year the sale of several of the above patents has been made to another major television organization in the United States. License thereunder has been retained by the Don Lee Broadcasting System.

**DEVELOPMENTS OF 1937-1938:** "Vine Street" believed to be the first television serial, is televised twice weekly on Tuesdays and Fridays; since November 1, 1938.

"The Tramp," "Swell," "Fire Sale," fifteen-minute plays written and produced especially for television have been given.

"Sports Bullseyes," a regular Mutual-Don Lee Broadcasting System program, has been televised twice weekly since June 3, 1938.

"Happy Homes" by Norma Young, with household demonstrations has been televised since July 8, 1938 on Wednesdays.

"The Television Trio," a swing ensemble, and numerous feminine vocal soloists have been consistently televised.

"U.S.C. on Parade," a University of Southern California program, written and produced by the members of the University especially for television is staged weekly on Thursdays, employs an average of twelve performers, and was started on November 10, 1938.

A clown act by "Jo-Jo" and his troupe is a weekly feature on Wednesday nights.

Hollywood commentators, including George Fisher of Mutual Broadcasting System, and others have been televised weekly.

News and strange fact commentators have been seen and heard nightly since June, 1938.

**RECEIVERS:** A few hundred receivers are estimated to be in operation in Los Angeles, Hollywood, Inglewood, West Hollywood, North Hollywood, Burbank, Glendale, Pasadena, Long Beach, and Pomona. The greatest distance of public reception is recorded at the city of Pomona which is thirty miles airline east of W6XAO and behind a range of hills. Three separately owned receivers are in operation in this city.

**PUBLIC DEMONSTRATIONS:** Public demonstrations of the Don Lee television transmissions are held weekly by an independent, non-profit organization known as the Hollywood Television Society. The Don Lee public demonstrations, inaugurated in 1936, are currently held at intervals for small groups.

## W2XVT

PASSAIC, N. J.—EST. 1938

**FREQUENCY:** 42,000 to 56,000 Mcs. **POWER:** 50 Watts (Sight and Sound). **OWNED AND OPERATED BY:** Allen B. DuMont Laboratories, Inc. **BUSINESS ADDRESS:** 2 Main Ave. **STUDIO ADDRESS:** Same. **TRANSMITTER AND ANTENNA LOCATION:** Same.

## FACILITIES

The transmitter is being used to test out the features of the DuMont Television System which does away with the necessity of the standardization of the number of pictures per second or lines per picture. This system requires approximately one-half the frequency band over that required by conventional systems now in use. The features of this system are the transmission of the actual scanning voltages and their amplification at the receiver.

## W3XPF

SPRINGFIELD, PA.

**FREQUENCY:** 42000 to 56000 Kc. and 80000 to 86,000 Kc. **POWER:** Sight, 250 Watts; Sound, 1000 Watts. **OWNED AND OPERATED BY:** Farnsworth Television, Inc. **BUSINESS AND STUDIO ADDRESS:** Springfield, Pa. **TRANSMITTER AND ANTENNA LOCATION:** Same.

## FACILITIES

A new type of television film projector was demonstrated in Philadelphia in March before a group which found pictures possessing contrast and definition. The Farnsworth innovation is a film projector of the continuous type rather than intermittent, which is in general use. Harry S. Bamford of the Farnsworth laboratory developed the projector.

Film travels at a constant speed through the new projector and the picture itself is focused on the cathode area of a dissector tube. Company executives link the projector with the high fidelity dissector tube and describe them as contributions "making it possible to reproduce film with a higher degree of excellence than is usually obtained."

The projector employs two lens disks to secure continuous projection. Each disk carries a total of 24 lenses and rotate in opposite directions. At any instant, however, two lenses are "active in conjunction with each other" due to overlapping.

## W9XAL

KANSAS CITY, MO.—EST. 1932

**FREQUENCY:** Sight, 42000 to 56000 Kc. and 80000 to 86000 Kc.; Sound, same. **POWER:** Sight, 300 Watts; Sound, 150 Watts. **OWNED AND OPERATED BY:** First National Television

Inc. BUSINESS ADDRESS: 22nd floor, Fidelity Bldg., Ninth and Walnut Sts. STUDIO LOCATION: Same. TRANSMITTER LOCATION: 34th floor, Fidelity Bldg.

## W 2 X B

ALBANY—EST. 1939

FREQUENCY: 60,000 to 86,000 Kc. POWER: Sight, 10,000 Watts; Sound, 3000 Watts. OWNED AND OPERATED BY: General Electric Co. BUSINESS, STUDIO, TRANSMITTER AND ANTENNA LOCATIONS: Albany. TIME ON THE AIR: No stated schedule.

### FACILITIES

G.E. will use a system similar to the RCA-NBC equipment but contemplates several entirely new variations. This will include positive modulation so-called "waves-shaped" separation and synchronizing signals as contrasted to amplitude separation. It is an all-electric system designed to produce a 411 line definition, 30 frames per second, 60 fields per second with an aspect ratio of 4 to 3. General Electric hopes to develop high power transmission at television frequencies and proper modulation of the television carrier signal. It also expects to improve vacuum tubes which will exhibit more favorable characteristics, develop wide band output coupling circuits without sacrificing plate efficiency and increase transmission fidelity by expanding the frequency range up to 4 megacycles. Simultaneous operation of stations at Albany and Bridgeport on the same frequency is expected to increase knowledge of diurnal and seasonal signal strength variations and determination of the amount of interference permissible, necessary geographic separation and effect of directional antennas.

This transmitter is expected upon completion to provide a high signal level to Albany, Troy and Schenectady.

Receivers: Two types of television receivers which have been developed by General Electric will be placed throughout the Schenectady-Albany-Troy area for experimental use. The G.E. receivers represent typical home units in the upper and lower price brackets. One, which is the more simple, is a table-model receiver with a cathode ray picture tube of five-inch diameter and includes the sound accompaniment. The second is of a more deluxe nature and employs a cathode-ray picture tube of twelve-inch diameter. It also includes the sound accompaniment.

Pictures are viewed in a mirror on the under surface of the lid, which is raised at an angle when viewing.

## W 1 X A

BRIDGEPORT—EST. 1939

FREQUENCY: 60,000 to 86,000 Kc. POWER: Sight, 10,000 Watts; Sound, 3000 Watts. OWNED AND OPERATED BY: General Electric Co. BUSINESS, STUDIO, TRANSMITTER AND ANTENNA LOCATIONS: Bridgeport. TIME ON THE AIR: No stated schedule.

### FACILITIES

This station will, on completion, serve as a locally controlled source of signal for the development of a satisfactory television receiving set. For further information concerning system used, facilities, etc., see information listed under W2XB, Albany, N. Y. (above).

## W 2 X D - W 2 X H

SCHENECTADY—EST. 1939

FREQUENCY: 42,000 to 56,000 Kc. POWER: 40 Watts (Sight only). OWNED AND OPERATED BY: General Electric Co. BUSINESS AND STUDIO ADDRESS: Schenectady. TRANSMITTER AND ANTENNA LOCATION: Indian Ladder, Heidelberg Hills, N. Y. TIME ON THE AIR: No stated schedule.

### FACILITIES

These stations, on completion, will be used for the most part in connection with experimental work in the laboratory and to supplement the experimental public service television programs of the G.E.'s Albany and Bridgeport transmitters. One of the Schenectady transmitters will serve as a relay visual station to transmit programs from the studio to the transmitter on a sharply directive beam obviating the necessity of a coaxial cable. For further information concerning system used for these stations, facilities, etc., see information listed under W2XB, Albany, N. Y. (above).

## W 1 X G

BOSTON

FREQUENCY: 42000 to 56000 Kc. and 80000 to 86,000 Kc. POWER: 500 Watts (visual). OWNED AND OPERATED BY: General Television Corp. BUSINESS ADDRESS: 70 Brookline Ave.

## W 9 X A K

MANHATTAN, KANS.—EST. 1932

FREQUENCY: 2000 to 2100 Kc. POWER: 125 Watts. Sound and Sight. OWNED AND OPERATED BY: Kansas State College of Agriculture and Applied Science. BUSINESS ADDRESS: Department of Electrical Engineering, Kansas State College. PHONE: 3-7182. STUDIO AND TRANSMITTER LOCATION: Same.



### Personnel

Head of the Dept. of Electrical Engineering  
R. G. Kloeffler  
Chief Operator ..... M. W. Horrell

## W2XBS

NEW YORK CITY—EST. 1928

FREQUENCY: 42000 to 58000 Kc. and 80000 to 88000 Kc. POWER: Sight, 12000 Watts; Sound, 15000 Watts. OWNED AND OPERATED BY: National Broadcasting Co. BUSINESS ADDRESS: 30 Rockefeller Plaza. STUDIO ADDRESS: Same. TRANSMITTER LOCATION: Empire State Bldg. TIME ON THE AIR: Limited service after April 30, 1939.

### Personnel

Chief Engineer ..... O. B. Hanson

### FACILITIES

This station uses the RCA television system. Broadcasts were experimental up to the present, having been made to a number of experimental receivers at the homes of NBC and RCA officials and technical personnel. With the introduction of limited service, it is believed that general interest will be spurred and that television cannot be considered entirely experimental; nevertheless NBC will continue further experimentation not only in its scheduled television broadcasts but also in connection with its research program.

Signals of this station have been satisfactorily received within a radius of approximately 60 miles.

Besides this station the National Broadcasting Co. has been granted a Construction Permit for W2XBT, mobile television station which is licensed to operate on 82,000 Kc. and from 175,000 to 180,000 Kc. with a power of 400 Watts for sight transmission and 100 Watts for sound transmission.

### HISTORY

Experimental television station W2XBS was originally installed at the RCA Technical and Test Laboratory, Van Cortlandt Park, New York City. The first construction permit was granted on April 4, 1928 and the first temporary license was issued in June, 1928. From time to time various station permits allowed television experimental transmission on 4800 Kc., 2300 to 3300 Kc., 2050 to 2150 Kc., 2000 to 2100 Kc. and 2100 to 2200 Kc. The first permanent license was issued on December 1, 1928 with an assigned frequency band of 2100 to 2200 Kc. In the latter part of 1928 the station was moved to the RCA Telephone Building, 411 Fifth Avenue. On June 27, 1930, it was moved to the Times Square Studio of the National Broadcasting Company, where on July 7, 1930 it passed from RCA to NBC management.

In 1931 NBC television was carried on from W2XBS's present location on the top of the Empire State Building.

During 1936 and 1937 NBC operated with the new high definition standards, demonstrating television to groups representing diverse interests, such as:

- Political
- Motion Picture
- Foreign (political and commercial)
- Press
- Advertisers (manufacturers)
- Advertising agencies
- Artists (talent and musicians)
- Naval and Military
- Educational
- Financiers, Bankers
- Retailers
- Radio Station men
- Trade associations
- Institutional (4H Club, Atlanta School of Air winners, etc.)

The technical standards of transmission from W2XBS have been and are expected to continue to be those recommended by the Radio Manufacturers Association.

## W3XE

PHILADELPHIA—EST. 1931

FREQUENCY: 42000 to 58000 Kc. and 80000 to 88000 Kc. POWER: Sight, 10000 Watts; Sound, 10000 Watts. OWNED AND OPERATED BY: Philco Radio & Television Corp. BUSINESS ADDRESS: Tioga and "C" Sts. STUDIO AND TRANSMITTER LOCATION: Same. TIME ON THE AIR: No stated schedule.

### Personnel

Engineer in Charge ..... Albert F. Murray

### FACILITIES

This station uses the Philco Television System. Reception which is heard in the homes of the company's engineers has been reported from points 12 miles from the transmitter.

This station which is used for experimentation and research in connection with television development radiates signals in accordance with the proposed RMA Television Standards; it employs the newly developed modulation system and is operating in the 50-56 Mc. channel.

## W3XP

PHILADELPHIA—EST. 1938

FREQUENCY: 204,000 to 210,000 Kc. POWER: 15 Watts (Sight and sound). OWNED AND OPERATED BY: Philco Radio & Television Corp. BUSINESS ADDRESS: Tioga and "C" Sts. STUDIO ADDRESS: Same. TRANSMITTER AND ANTENNA LOCATION: Same. TIME ON THE AIR: No stated schedule.

### Personnel

Engineer in Charge ..... Albert F. Murray

### FACILITIES

This station uses the Philco transmission line modulation system. It is used principally for a survey in Philadelphia of the possibilities of broadcasting at frequencies above 200 Mcs. The transmitter radiates signals in accordance with the proposed RMA television standards.

## W9XG

LAFAYETTE, IND.—EST. 1932

FREQUENCY: 2000 to 2100 Kc. POWER: 1500 Watts. OWNED AND OPERATED BY: Purdue University. BUSINESS ADDRESS: Electric Bldg., Purdue University. PHONES: 6475, 2917. TRANSMITTER LOCATION: West Lafayette. TIME ON THE AIR: Tuesday, at 7:30 P.M. Thursday, at 8:00 P.M.

### Personnel

Head of School of Electrical Engineering  
C. Francis Harding  
R. H. George H. J. Helm

### FACILITIES

This station uses a television system that has been developed at Purdue University.

## W2XDR

LONG ISLAND CITY, N. Y.

FREQUENCY: 42000 to 56000 Kc. and 60000 to 86000 Kc. POWER: Sight, 1000 Watts; Sound, 500 Watts. OWNED AND OPERATED BY: Radio Pictures, Inc.

## W3XAD

CAMDEN, N. J.—EST. 1931

FREQUENCY: 124000 to 130000 Kc. POWER: Sight, 500 Watts; Sound, 500 Watts. OWNED AND OPERATED BY: RCA Manufacturing Co. BUSINESS ADDRESS: RCA Frequency Bureau, 30 Rockefeller Plaza, New York City. TRANSMITTER LOCATION: Portable Laboratories in Camden, N. J. TIME ON THE AIR: No stated schedule.

### FACILITIES

This station is an experimental portable unit and no one system is strictly adhered to; a complete description of the basic method used in transmission is given in the Proceeding of the Institute of Radio Engineers (Vol. 22, No. 1, November, 1934).

Several experimental television receivers have been set up within a 2 or 3 mile radius for experimental purposes.

The frequency band occupied by this transmitter is 2.5 mc. on each side of the carrier. This band width is determined by measuring the overall frequency characteristics of the system.

## W3XEP

CAMDEN, N. J.—EST. 1935

FREQUENCY: 42000 to 56000 Kc. and 60000 to 86000 Kc. POWER: Sight, 30000 Watts; Sound, 30000 Watts. OWNED AND OPERATED BY: RCA Manufacturing Co. BUSINESS ADDRESS: RCA Frequency Bureau, 30 Rockefeller Plaza, New York City. TRANSMITTER LOCATION: Camden, N. J. TIME ON THE AIR: No stated schedule.

### FACILITIES

This station is experimental and no one system is strictly adhered to; a complete description of the basic method used in transmission is given in the Proceeding of the Institute of Radio Engineers (Vol. 22, No. 11, November, 1934).

Several experimental television receivers have been set up within 2 or 3 miles of each other. The receivers are a part of the equipment used in television research.

The frequency band occupied by the transmitter is 2.5 mc. on each side of the carrier.

## W10XX

PORTABLE—MOBILE

FREQUENCY: 42,000 to 56,000 Kc. and 60,000 to 86,000 Kc. POWER: Sight, 50 Watts; Sound, 50 Watts. OWNED AND OPERATED BY: RCA Mfg. Co. TIME ON THE AIR: No stated schedule.

### FACILITIES

This station is a portable unit used in conjunction with other television transmitter operated by the RCA Mfg. Co.

## W9XK

IOWA CITY

FREQUENCY: 2000 to 2100 Kc. (Sight only). POWER: 100 Watts (Sight only). OWNED AND OPERATED BY: University of Iowa.

## W9XUI

IOWA CITY

FREQUENCY: 42000 to 56000 Kc. and 60000 to 86,000 Kc. (Sight only). POWER: 100 Watts (Sight only). OWNED AND OPERATED BY: University of Iowa.

## W9XZV

CHICAGO, ILL.—EST. 1938

FREQUENCY: 42,000 to 56,000 Kc. and 60,000 to 86,000 Kc. POWER: 1000 Watts (Sight and Sound). OWNED AND OPERATED BY: Zenith Radio Corp. BUSINESS ADDRESS: 6001 Dickens Ave. PHONE: Berkshire 7500. STUDIO ADDRESS: Same. TRANSMITTER AND ANTENNA LOCATION: Same. TIME ON THE AIR: Experimental, no stated schedule.

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